

Claims

- [c1] 1. A shift control apparatus for a bicycle transmission comprising:
a signal detector that detects signals corresponding to motion of the bicycle;
a threshold setting unit that sets a shift threshold value;
a time interval calculating unit that calculates time intervals after signals are detected; and
a control unit that provides a signal to change a gear in the bicycle transmission only after a time interval between successive first and second signals passes the shift threshold value and the second signal is detected by the signal detector.
- [c2] 2. The apparatus according to claim 1 wherein the threshold setting unit sets a first downshift threshold value, and wherein the control unit provides a signal to downshift the bicycle transmission only after a time interval between successive first and second signals passes the first downshift threshold value and the second signal is detected by the signal detector.
- [c3] 3. The apparatus according to claim 2 wherein the control unit provides the signal to downshift the bicycle

transmission only after the time interval between successive first and second signals is greater than the first downshift threshold value.

[c4] 4. The apparatus according to claim 2 wherein the threshold setting unit sets a second downshift threshold value that is different from the first downshift threshold value, and wherein the control unit provides the signal to downshift the bicycle transmission only after a plurality of time intervals between a corresponding plurality of successive first and second signals are between the first and second downshift threshold values and a most recent second signal is detected by the signal detector.

[c5] 5. The apparatus according to claim 4 wherein the control unit provides the signal to downshift the bicycle transmission after only one time interval between successive first and second signals passes the first downshift threshold value and the second signal is detected by the signal detector.

[c6] 6. The apparatus according to claim 5 wherein the control unit provides the signal to downshift the bicycle transmission after only one time interval between successive first and second signals is greater than the first downshift threshold value.

- [c7] 7. The apparatus according to claim 1 wherein the threshold setting unit sets an upshift threshold value, and wherein the control unit provides a signal to upshift the bicycle transmission only after a time interval between successive first and second signals passes the upshift threshold value and the second signal is detected by the signal detector.
- [c8] 8. The apparatus according to claim 7 wherein the control unit provides the signal to upshift the bicycle transmission only after a plurality of time intervals between a corresponding plurality of successive first and second signals passes the upshift threshold value and a most recent second signal is detected by the signal detector.
- [c9] 9. The apparatus according to claim 8 wherein the control unit provides the signal to upshift the bicycle transmission only after the plurality of time intervals is less than the upshift threshold value.
- [c10] 10. The apparatus according to claim 1 wherein the threshold setting unit sets an upshift threshold value, wherein the control unit provides a signal to upshift the bicycle transmission only after a time interval between successive first and second signals passes the upshift threshold value and the second signal is detected by the signal detector, wherein the threshold setting unit sets a

first downshift threshold value, and wherein the control unit provides a signal to downshift the bicycle transmission only after a time interval between successive first and second signals passes the first downshift threshold value and the second signal is detected by the signal detector.

[c11] 11. The apparatus according to claim 10 wherein the control unit provides the signal to upshift the bicycle transmission only after a plurality of time intervals between a corresponding plurality of successive first and second signals passes the upshift threshold value and a most recent second signal is detected by the signal detector.

[c12] 12. The apparatus according to claim 11 wherein the control unit provides the signal to upshift the bicycle transmission only after the plurality of time intervals is less than the upshift threshold value.

[c13] 13. The apparatus according to claim 10 wherein the threshold setting unit sets a second downshift threshold value that is different from the first downshift threshold value, and wherein the control unit provides the signal to downshift the bicycle transmission only after a plurality of time intervals between a corresponding plurality of successive first and second signals are between the first

and second downshift threshold values and a most recent second signal is detected by the signal detector.

[c14] 14. The apparatus according to claim 13 wherein the control unit provides the signal to downshift the bicycle transmission after only one time interval between successive first and second signals passes the first downshift threshold value and the second signal is detected by the signal detector.

[c15] 15. The apparatus according to claim 14 wherein the control unit provides the signal to upshift the bicycle transmission only after a plurality of time intervals between a corresponding plurality of successive first and second signals passes the upshift threshold value and a most recent second signal is detected by the signal detector.

[c16] 16. The apparatus according to claim 15 wherein the control unit provides the signal to downshift the bicycle transmission after only one time interval between successive first and second signals is greater than the first downshift threshold value, and wherein the control unit provides the signal to upshift the bicycle transmission only after the plurality of time intervals is less than the upshift threshold value.

- [c17] 17. The apparatus according to claim 1 wherein the signal detector is structured to detect signals corresponding to a wheel speed of the bicycle.
- [c18] 18. The apparatus according to claim 17 wherein the signal detector is structured to detect signals from an alternating current generator that rotates with a bicycle wheel.
- [c19] 19. The apparatus according to claim 1 wherein the signal detector is structured to detect signals corresponding to a crank speed of the bicycle.
- [c20] 20. The apparatus according to claim 1 wherein the control unit is disposed in an electronically controlled shift control device for the bicycle.
- [c21] 21. The apparatus according to claim 1 wherein the signals comprise pulses.
- [c22] 22. The apparatus according to claim 21 wherein the signals comprise magnetic pulses.